

What is claimed is:

1. A method for controlling a washing step in a blood centrifugation cell wherein washing solution is introduced into the blood centrifugation cell in the washing step, the cell containing compacted red blood cells and supernatant at the beginning of the washing step, the method comprising:

providing a blood centrifugation cell, a pump for communicating liquid to the blood centrifugation cell, and a computer configured to receive data and produce at least one output;

providing first input data to the computer indicative of the total volume of liquid that has entered the cell during the filling step that precedes the washing step and during the washing step itself, the liquid being blood during the filling step and the liquid being washing solution during the washing step;

providing second input data to the computer indicative of the hematocrit value of the blood that was introduced during the filling step;

providing third input data to the computer indicative of the geometric characteristics of the cell;

processing the first, second, and third input data in the computer to produce a first output, said first output being the concentration of the supernatant in the supernatant-washing solution mixture that is present in the cell during the washing step, said first output being produced by the computer executing an algorithm that expresses the supernatant extinction law inside the cell using the first, second, and third input data; and

stopping the washing step when a certain concentration of supernatant in the supernatant-washing solution is reached.

2. The method of claim 1, wherein the algorithm has time as a fourth input data.

3. The method of claim 1, wherein the algorithm that expresses the supernatant extinction law inside the cell is derived from a mathematical model.

4. The method of claim 1, wherein the algorithm that expresses the supernatant extinction law inside the cell is derived from an experimental analysis.

5. The method of claim 1, wherein the pump is a peristaltic pump comprising on the drive shaft of the pump a sensor suitable to transmit to the computer said first input data related to the rotation angles of said drive shaft.

6. The method of claim 1, further comprising providing a sensor for measuring the volume of liquid entering the cell and suitable to transmit to the computer said first input data.

7. The method of claim 1, further comprising providing a sensor for measuring the hematocrit value of the blood entering the cell during the filling step and suitable to transmit to the computer said second input data.

8. The method of claim 1, further comprising providing an operator interface for entering into the computer said second input data indicative of the hematocrit value of the blood.

9. The method of claim 8, wherein said pump comprises an intake and a cardiotomy reservoir is located at the intake for said pump, and wherein said data indicative of the hematocrit value of the blood is determined by measuring a hematocrit value of the blood in the cardiotomy reservoir.

10. The method of claim 1, further comprising providing an operator interface for entering into the computer said third input data indicative of the geometric characteristics of the cell.

5 11. The method of claim 1, further comprising providing a sensor for automatically detecting the geometric characteristics of the cell and suitable to transmit to the computer said third input data.

10 12. The method of claim 1, further comprising providing an operator interface for displaying the concentration of the supernatant in the supernatant-washing solution mixture.

13. The method of claim 12, wherein the operator stops the washing step when a certain concentration of supernatant is reached.

15 14. The method of claim 1, further comprising providing a controller for stopping the washing step when a certain concentration of supernatant in the supernatant-washing solution is reached.

20 15. The method of claim 14, wherein the controller stops the washing step when a preset value of the concentration of supernatant in the supernatant-washing solution mixture is reached.

25 16. An apparatus for controlling a washing step in a blood centrifugation cell wherein washing solution is introduced into the blood centrifugation cell in the washing step, the cell containing compacted red blood cells and supernatant at the beginning of the washing step, the apparatus comprising:

a pump for communicating liquid to the blood centrifugation cell;  
a first sensor configured to produce first input data indicative of the

total volume of liquid that has entered the cell during the filling step that precedes the washing step and during the washing step itself, the liquid being blood during the filling step and the liquid being washing solution during the washing step;

5                   a computer which executes an algorithm that expresses the extinction law of the supernatant inside the cell using said first input data, second input data indicative of the hematocrit value of the blood that was introduced during the filling step, and third input data indicative of the geometric characteristics of the cell, to produce a first output, said first  
10                   output being the concentration of the supernatant in the supernatant-washing solution mixture;

                  an operator interface for entering input data and displaying said first output data; and

                  a controller for stopping the washing step when a certain  
15                   concentration of supernatant in the supernatant-washing solution is reached.

17.     The apparatus of claim 16, further comprising a second sensor for measuring the hematocrit value of the blood entering the cell during the filling step and suitable to transmit to the computer said second input data.

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18.     The apparatus of claim 16, further comprising a second sensor for automatically detecting the geometric characteristics of the cell and suitable to transmit to the computer said third input data.

25           19.     The apparatus of claim 16, wherein the pump is a peristaltic pump comprising on the drive shaft of the pump the first sensor suitable to transmit to the computer said first input data related to the rotation angles of said drive shaft.

20. The apparatus of claim 16, further comprising a second sensor for measuring the volume of liquid entering the cell and suitable to transmit to the computer said first input data.